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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,236	08/16/2001	Haining Yang	MI22-1725	4828

21567 7590 03/26/2004

WELLS ST. JOHN P.S.  
601 W. FIRST AVENUE, SUITE 1300  
SPOKANE, WA 99201

EXAMINER

HOGANS, DAVID L

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/932,236

Applicant(s)

YANG, HAINING

Examiner

David L. Hogans

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 48-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 48-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1-05-04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This Office Action is in response to the Amendment filed on January 5, 2004.

#### ***Status of Claims***

Claims 48-54 are pending. Claims 1-47 are cancelled.

#### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on January 5, 2004, is in compliance with the provisions of 37 CFR 1.97, and accordingly, has been considered by the examiner.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 48-54 are rejected under 35 U.S.C. 102(b) as being anticipated by 6,074,945 to Vaartstra et al.

In reference to Claims 48 and 50-52, Vaartstra et al. teaches:

- providing a semiconductor substrate (16); (See Figure 1 and columns 1-6 lines 55-60)
- exposing one or more metallo-organic precursors (tricarbonyl-cyclohexadiene ruthenium)(40) to a reducing atmosphere comprising one

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- or both of  $\text{NH}_3$  and an activated hydrogen species (noting the use of photo or plasma assisted deposition and the use of plasma enhanced reactors) to release metal from the one or more precursors, wherein the precursors comprise carbon and not Ti or Pt during the exposing; (See Figure 1 and columns 1-6 lines 55-60)
- depositing the released metal over the semiconductor substrate to form a metal-comprising material on the semiconductor substrate; (See Figure 1 and columns 1-6 lines 55-60) and
  - wherein the substrate comprises an oxidizable upper surface (i.e. – silicon) and wherein the metal-comprising material is formed physically against the upper surface (See Figure 1 and columns 1-6 lines 55-60)

In reference to Claims 49 and 54, Vaarstra et al. teaches:

- wherein the upper surface comprises one or more of Ti, WN, and Ta and the upper surface is exposed to the reducing atmosphere during the release of at least some of the metal (See Figure 1 and columns 1-6 lines 55-60; specifically noting column 6 lines 05-20)

In reference to Claim 53, Vaarstra et al. teaches:

- wherein a hydrogen species of the activated hydrogen species comprises  $\text{H}_2$  (See Figure 1 and columns 1-6 lines 55-60)

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4. Claim 48 is rejected under 35 U.S.C. 102(b) as being anticipated by 5,248,636 to Davis et al.

In reference to Claim 48, Davis et al. teaches:

- providing a semiconductor substrate; (See column 31 lines 05-33)
- exposing one or more metallo-organic precursors to a reducing atmosphere comprising one or both of  $\text{NH}_3$  and an activated hydrogen species to release metal from the one or more precursors, wherein the precursors comprise carbon and not Ti or Pt during the exposing; (See column 31 lines 05-33) and
- depositing the released metal over the semiconductor substrate to form a metal-comprising material on the semiconductor substrate (See column 31 lines 05-33)

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 48, 50 and 51 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,143,191 to Baum et al.

In reference to Claims 48 and 50-51, Baum et al. teaches:

- providing a semiconductor substrate; (See abstract and columns 2-5 lines 60-62)
- exposing one or more metallo-organic precursors (i.e. – beta diketone iridium) to a reducing atmosphere comprising one or both of  $\text{NH}_3$  and an activated hydrogen species to release metal from the one or more precursors, wherein the precursors comprise carbon and not Ti or Pt during the exposing; (See abstract and columns 2-5 lines 60-62) and
- depositing the released metal over the semiconductor substrate to form a metal-comprising material on the semiconductor substrate (See abstract and columns 2-5 lines 60-62)
- wherein the substrate comprises an oxidizable upper surface (i.e. – a dielectric or ferroelectric) and wherein the metal-comprising material is formed physically against the upper surface (See abstract and columns 2-5 lines 60-62)

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 48-54 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.**

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See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (571) 272-1691. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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